



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SR-6J

August 24, 2021

968737

John Wolski
Senior Remediation Manager
Raytheon Technologies - Corporate Remediation
9 Farm Springs Road
Farmington, CT 06032

**Subject: Review of 2020 Annual *Groundwater Management Zone (GMZ) Monitoring and System Performance Report*
Hamilton Sundstrand Corporation (HSC) Plants 1/2 Facility
Area 9/10 Remedial Action
Southeast Rockford Groundwater Contamination Superfund Site, Rockford, Illinois
*ILD981000417***

Dear Mr. Wolski:

U.S. Environmental Protection Agency (EPA) has reviewed the above titled document dated March 9, 2021 prepared by AECOM on behalf of HSC for the Southeast Rockford Groundwater Contamination Superfund Site (Site), Source Area 9/10 (SA 9/10) in Rockford, Illinois. EPA is requiring a revision of the above titled report and an accompanying response to comments. For those comments that need further communication due to uncertainties or differences regarding the comment content, EPA recommends a teleconference with HSC and their technical team, Illinois EPA, and EPA for comment adjudication and finalization of this report.

General and specific comments are below.

General Comments

1. To streamline this comment letter, please apply all appropriate comments from EPA's June 29, 2021 *Review of First Quarter 2021 GMZ and System Performance Report* (1Q 2021 Comment Letter) to the 2021 and future Annual GMZ Monitoring and System Performance Reports (Annual Report).
2. As expressed in EPA's 1Q 2021 Comment Letter (General Comment #3) EPA is concerned about an unmitigated potential source (or sources) and its impact on elevated (greater than Maximum Contaminant Limits [MCLs]) groundwater concentrations along western GMZ 1 and 2 boundaries. Tetrachloroethene (PCE) has been largely persistent with little to no evidence of degradation particularly at GMZ01, SMW04, and SMW08. One potential source is the OSA where known PCE concentrations at depth (26 – 30 foot [ft] below ground surface [bgs]) exceed the preliminary remediation goal (PRG) for soil (60 ug/kg, soil component for protection of groundwater), which is also the same depth(s) for groundwater and is upgradient of GMZ01 and SMW08. There are also concentrations of PCE (40 – 60 ug/kg), although less than the PRG, as deep as 32 feet bgs in the OSA. A previous remedial action (RA) addressed OSA soils with a focus on shallow soils (e.g., 3 – 6 ft bgs) and infiltration (cap) the RA does not appear to address contaminated soil at depth and potential impacts on groundwater.

Furthermore, it will also be telling if the air sparge/soil vapor extraction (AS/SVE) system area of influence is impacting or encompasses PMW01 and PMW02. Upcoming quarterly event results during system shutdown will provide information for further evaluation of this concept.

Alternative Cleanup Levels (ACLs) are discussed in this 2020 Annual Report. Prior to the Agencies making decisions regarding the development (and use) of ACLs, as presented in the *Work Plan for the Development of Site-Specific Alternative Cleanup Levels* (HSC 2017) and subsequent comment (EPA 2019) and response (HSC 2020) letters, the likelihood of an ongoing source (onsite) in (and/or immediately east of) OSA soils affecting groundwater, warrants further evaluation by HSC, and communication with the Agencies on an appropriate path forward to achieve MCLs at the western GMZ 1 and 2 boundaries. It is unclear why there is inconsistency in how (similar) contamination is addressed at the site; one part of the Site (southern boundary) is achieving MCLs with active treatment and the western boundary is not with a seemingly unmitigated source at depth and no active treatment (and no degradation to daughter products), yet an ACL is proposed.

3. Consider including an evaluation of water level impacts on contaminants of concern (COCs) at SA 9/10 in this and future Annual Reports. This could include long-term and short-term (i.e., that year's data) evaluation of groundwater level fluctuations, flow patterns (pre remedy and system pulse on/off affects) along with corresponding analytical data, and river stage data (hydrographs). Evaluating these types of fluctuations particularly with respect to the western wells, the OSA, and MCL exceedances may provide another line of evidence to sort out impacts along the western GMZ boundary.

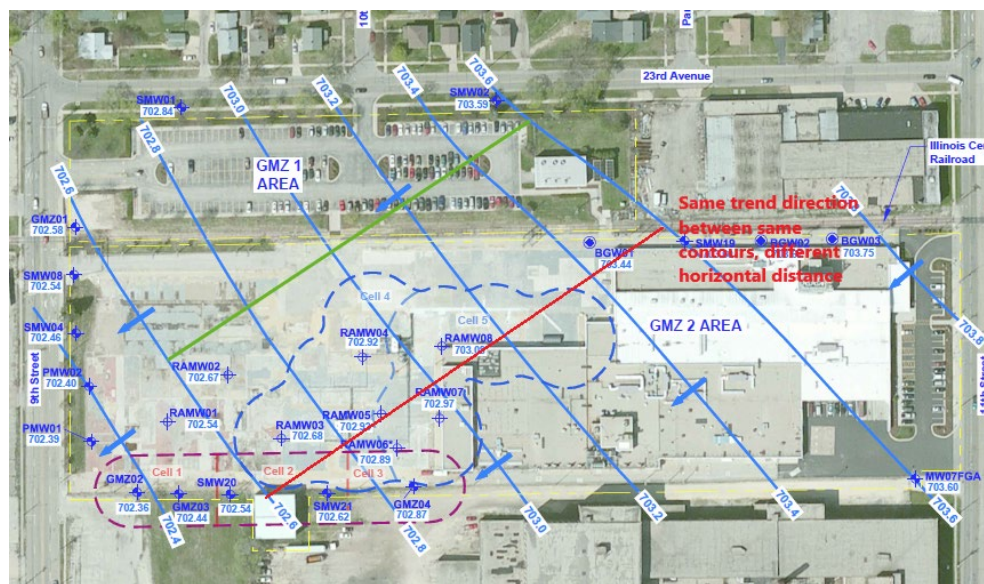
4. SMW19 is consistently above MCLs/PRGs for TCE. What is HSC's plan to meet remedial action objective (RAO) #3 for this area particularly since this well is upgradient of the AS/SVE area of influence and currently there is a plan to shutdown the AS/SVE system? EPA recommends HSC present a conceptual site model with a multiple lines of evidence assessment (groundwater flow direction, groundwater elevation fluctuations, degradation products, comparison to other known sources at SA 9/10, etc.) for this monitoring well/area to understand how this area impacts the remainder of SA 9/10 and what the source (if different, upgradient, or offsite) may be for these MCL/PRG exceedances.

Specific Comments

1. **Page 1-1. Paragraph 4. Last Sentence.** Revise (or remove) this sentence regarding "final leachate goals have not been established" to accurately portray the PRGs/MCLs per the Record of Decision (ROD) (EPA 2002) and Consent Decree (CD) (EPA 2008). At present, the leachate "goal" is to meet MCLs at the GMZ boundary and there is not necessarily any future change from that goal or as the sentence reads, a "final" goal.

Please note: Per the ROD (EPA 2002), the GMZ boundary is the point of compliance for the source area. Specifically, "PRGs for leachate are based on federal MCLs and must be met at the GMZ Boundary", and the RAO states that the remedy will "prevent the further migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to level in excess of state or federal standards, or that pose a threat to human health or the environment." EPA recognizes that in Appendix C (Statement of Work) of the CD there is a statement, "The Performance Standards for each source area at the Hamilton Sundstrand Property shall be met by achieving numeric criteria described ... in the ROD, or as applicable, as described below in this Section II.D.2." Section II.D.2 refers to the ACLs at the GMZ boundary, following the remedial action process flow diagram (RAPFD). However, currently we are not at this step (see General Comment #2 above). EPA also does not concur with HSC's assessment that leachate results at the western GMZ boundary 1 and 2 show "repeated and consistent asymptotic sampling results" as per the RAPFD (see EPA's 1Q 2021 Comment Letter and relevant specific comments below).

2. **Page 1-2. Paragraph 1.** Refine the language in this paragraph. As commented in this and prior quarterly and annual reports, EPA does not concur that all the wells along the western boundary “continue to demonstrate stable or decreasing trends or no trends” and the interpretation of what a ‘Stable’ or ‘No Trend’ evaluation means. Also, include specific language such as “HSC believes that the development of ACLs is appropriate at this time”.
3. **Page 2-2. Paragraph 2. Sentence 2.** Is there a standard operating procedure (SOP) or work plan that defines how long the system must be turned off to collect groundwater elevations, when the scheduled measurements are during a typical “pulse-on” mode? If so, please provide that reference. If not, please provide a best practice rationale for a minimum duration. Additionally, if 3 days is a deviation from a SOP, work plan, or best practice, please include that in a “Deviations and Uncertainties” section for these types of reports. That would also be applicable to identify any other deviations or uncertainties that would occur (e.g., stabilization parameters, power outages, etc.)
4. **Page 4-1. Paragraph 3. Sentence 2.** Consistency in analytical results is not a reliable indicator that the sample quality was not affected by not attaining the required water stabilization criteria. There is no expectation of consistent analytical results in an environmentally compromised groundwater system. The statement should be reworded.
5. **Page 4-2. Paragraph 4 and Figures 3, 4, 5, 6.** Hydraulic gradients appear to have been computed from contours which presupposes the contours are precisely placed relative to the data. The position of the green line on the figures is subjective and could easily be moved to indicate the same directional trend in a different area but calculating to a different gradient magnitude because the gradient line would be longer or shorter (see red line in figure below). It is recommended that the calculation of gradients across this Site be computed between two wells, one upgradient and one downgradient, for consistency from period to period; perhaps MW203 and GMZ01 or other matched pair on opposite sides of the Site that represent the general direction of flow.

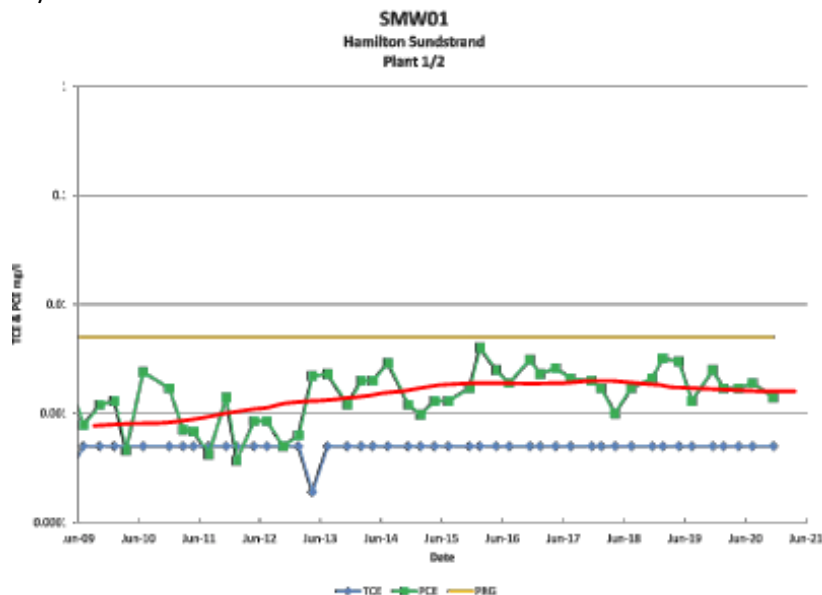


6. **Page 4-2. Paragraph 5.** Additional details of this analysis should be given. Questions that should be addressed at minimum include:
 - Was the value obtained onsite from a pump test or aquifer materials analysis or from a remote location?
 - What methods were used to obtain the hydraulic conductivity value?
 - Was this hydraulic conductivity value from a single aquifer test (sample) or multiple aquifer tests (samples)?

- If multiple aquifer tests (samples), what was the range of hydraulic conductivity values?
 - What is the uncertainty of the hydraulic conductivity measurement?
 - What depth(s) does this hydraulic conductivity value apply to in relation to the depths of the well screens and suspected depths of occurrence of COCs?
 - How was the effective porosity value obtained?
 - What is the estimated error range for the seepage velocity considering the variation in the expected range of hydraulic conductivity and effective porosity in the aquifer material at the Site?
7. **Page 4-2. Paragraph 6. Sentence 1.** Clarify in the text what “average leachate elevation” means since it is not explained. Uncertainty in the sentence arises because the average of the water level elevations at the Site and the average elevation of the water level at the Site are two different things. The “Ave. GW Elev.” from Table 1 appears to be the average of the water level elevations at all the wells at the Site. Please note that the “Ave. GW Elev.” is strongly influenced by the spatial distribution of the data points and does not necessarily represent the “overall” average of the water level at the Site.
 8. **Page 4-2. Paragraph 6. Sentence 2.** Reword this sentence as it is not clear how the overall average was computed. Is this the average of the quarterly averages in 2019 compared to the average of the quarterly averages in 2020?
 9. **Page 5-1. Paragraph 4.** A total of 8.5 pounds of volatile organic compounds (VOCs) were removed using the AS/SVE system in 2020 which represents about 0.45% of the total. This seems like substantial mass is still being removed under the current (2020) operational parameters for the system.
 10. **Page 6-1. Paragraph 4. Sentence 1.** This sentence leads one to interpret the statements around the removal rates and total mass removed as estimated minimums, please state this in the report as such.
 11. **Page 6-2. Paragraph 6.** This statement is too concrete. It implies that the AS/SVE system is no longer capable of any additional VOC removal. Yet a minimum of 8.5 pounds was removed in 2020 representing of 0.45% of the total mass removed by the system. Please replace “at the end” with “nearing the end”.
 12. **Page 6-3. Paragraph 4 and Table 8.**
 - a. The data in Table 8 and the discussion in the Statistical Analysis section need to be clarified to better understand which of the tests shown represent statistically significant tests. Please note, that statistical tests such as Mann-Kendall are most useful when other less rigorous analyses, such as visual interpretation of time series plots and Lowess curves are used in concert with the statistical analyses.
 - b. Provide (e.g., in an Appendix) the dataset used to produce Table 8. The reader should be able to verify these results.
 - c. In the text and Table 8 provide the p-value of the test and the chosen alpha value. The p-value that is associated with the statistic is of primary concern and indicates if the trend is or is not significant. P-values should be listed for each test and the threshold of significance (usually chosen to be 0.05 or 0.01) should not vary for the analysis.
 - d. The difference between ‘Stable’ and ‘No Trend’ should be described in both the text and table notes.
 - e. Please provide in the text the software name and the selected 40 data points used in the analysis.
 - f. Provide information in the text regarding if 40 points represent the whole dataset or is it a subset? How were censored values (values less than the laboratory reporting level) handled in the analysis? How were ties (which censored values would likely be classified as since

they are all the same value) handled as ties in ranked data often pose problems in nonparametric analyses.

13. **Page 6-3. Paragraph 4. Last Sentence.** Please clarify this sentence. What trends are referred to here? Were the Mann-Kendall tests rerun with data from the listed years and find the same result? Was this statistic run in 2012....2019 and reported in the previous annual reports?
14. **Page 8-1. Paragraph 1. Sentence 1.** It is unclear (and potentially misleading) how in the opening sentence to the Conclusions section the report states that, "...leachate COC concentrations within the defined "source areas" are below PRGs within the GMZ", when GMZ01, SMW08, SMW04, PMW02, and PMW01 all had concentrations greater than the MCL/PRG for all sampling quarters except in December 2020 for PMW02. Perhaps there is an alternate meaning to "defined source areas", although EPA interpreted this phrase to mean SA 9/10 is a defined source area within Operable Unit 3. Please clarify the text.
15. **Page 8-1. Paragraph 3. Sentence 1.** This statement seems subjective without including a before and after delineation of contamination. Please include the original and current aerial extent of the VOC leachate.
16. **Page 8-1. Paragraph 3. Last Sentence.**
 - a. Remove the word "only".
 - b. Please revise, as the sum of Phase 1 and Phase 2 mass for 2020 is $1.6 + 6.9 = 8.5$ pounds.
 - c. Please clarify, as EPA was of the understanding that the SVE system is designed to remove VOCs from the soils in the unsaturated zone in the AS/SVE system area of influence, and not specifically from groundwater/leachate.
17. **Page 8-1. Paragraph 5.**
 - a. This paragraph should be reworded according to revisions rendered to the trend analyses as stated in previous comments, as applicable. Also note that 'Stable' and 'No Trend' are not synonymous with 'asymptotic'.
 - b. Last Sentence. This statement appears to be overconfident. When taken in shorter periods of time, there are multiple increasing trends in the time series data. Also, SMW01 shows an increasing trend in PCE in the overall time series plot (see plot below). For further clarification see EPA's 1Q 2021 Comment Letter (General Comment #3) regarding trend interpretation(s). Furthermore, how are conditions downgradient improving as downgradient of the western GMZ 1 and 2 boundary, sample results are not presented/assessed?



18. **Page 8-2. Paragraph 2.** Please remove this text. This information was already presented in the Introduction and does not need to be reiterated in a Conclusions section.
19. **Page 8-2. Paragraph 3.** Please remove this text. This information is documented in other deliverables (ACL Work Plan) and is described in the Introduction. However, EPA raises significant concerns about the conceptual site model that indicates most of the SA 9/10 VOC mass is being remediated by the AS/SVE system. This does not seem to be the case as witnessed by the sustained PCE concentrations along the western GMZ boundary in GMZ01, SMW08, and SMW04 since remediation/monitoring commenced in addition to what appears to be PCE contaminated soils left in place at least within the OSA investigation area at the depths where groundwater flows and is also outside the AS/SVE area of influence for these wells.

It seems that a comprehensive description of the wells along the western boundary compared to MCLs/PRGs and proximity to AS/SVE system affects and the OSA should be summarized in this section instead of presenting a hypothetical result.

20. **All Figures.** The symbols for BGW01, BGW02, and BGW03 should be included on the figure legend.
21. **Figure 3.** Water-level values for wells SMW01 and SMW02 do not match the contours as drawn. It appears that SMW02 was indicated as anomalous (asterisk appears next to the name in the figure) but SMW01 was not. These water levels appear in Table 1 as different values and the table does not indicate that they are anomalous. What was the justification that the water-level for SMW02 was anomalous? Values in Table 1 and Figures 3 through 6 should be verified and recontoured as appropriate.



22. **Figure 6.**
- Wells BGW01, BGW02, and BGW03 have no data in the figure, and this is not discussed in the text. The values for these wells can be found on Table 1. Please explain and include the data.

- b. "Gradient calculation line" appears to be misplaced with endpoints between contours (which is different than this line as it appears on Figures 3, 4, & 5).



If you have any questions, please call me at (312) 886-7153.

Sincerely,

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Remedial Project Manager

cc (via electronic mail):

Brian Conrath, Project Manager, IEPA
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Joe Richards, Hydrogeologist, USGS